

SPHERES/Universal ISS Battery Charging Station, Phase I

Completed Technology Project (2011 - 2011)



Project Introduction

With the retiring of the shuttle fleet, up-mass and down-mass to ISS are at a premium. The space station itself has a limited lifecycle as well, thus long-term and/or high-risk development programs pose issues for science 'return on investment', if the technology cannot be adequately matured before the station is decommissioned. Thus innovative systems and technologies that minimize impact on limiting resources such as up-mass and down-mass, and can do so in the near- to mid-term, are highly desirable. One such area includes the various rechargeable battery systems on ISS used extensively for cameras, camcorders, laptops, communication systems and other portable science and diagnostic equipment. All new rechargeable batteries intended for use on ISS must undergo an extensive and costly qualification process, to ensure they meet safety criteria for charge, discharge, short-circuit, temperature, containment and other parameters. The associated recharging systems must also undergo rigorous safety analysis before obtaining flight approval. To alleviate this requirement, new battery powered equipment for ISS is often selected based on legacy technology already approved for crewed-space applications, and not on operational need. The use of shared battery resources (battery packs, battery chargers or both), for future ISS payloads could reduce or eliminate the time and cost needed to obtain battery system safety approval, and reduce the burden on valuable up-mass resources. A common (universal) battery charging system for ISS, with the flexibility to accommodate current and future rechargeable battery requirements for payloads and equipment, could reduce the cost use of the ISS by future payload developers. This would not only simplify the safety and integration process for these programs, but also reduce up-mass by making use of existing ISS resources.



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Responsible Program:

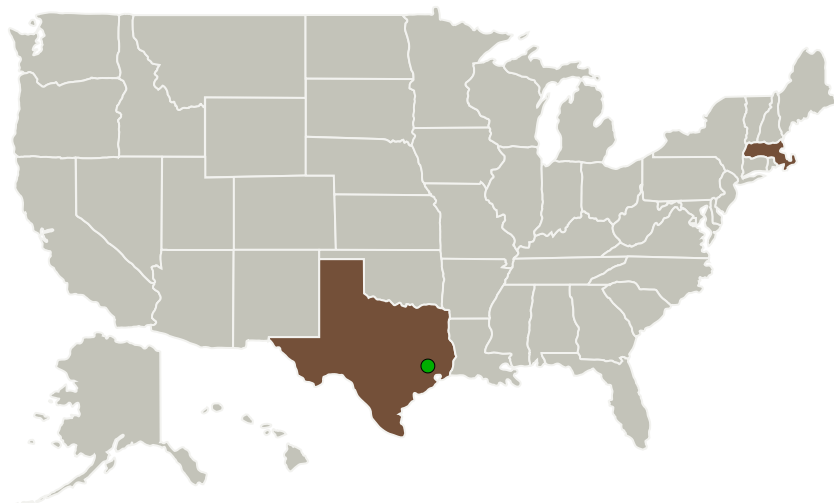
Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
● Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Massachusetts	Texas

Project Transitions

▶ **February 2011:** Project Start

✓ **September 2011:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140187>)

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

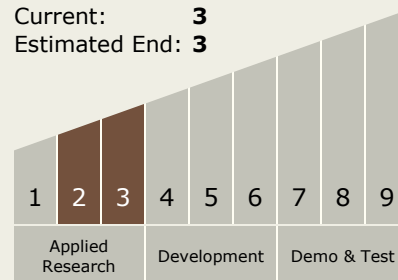
John F Merk

Co-Investigator:

John Merk

Technology Maturity (TRL)

Start: 2
Current: 3
Estimated End: 3



Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - TX03.2 Energy Storage
 - TX03.2.1 Electrochemical: Batteries

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Target Destinations

The Sun, Earth, The Moon,
Mars, Others Inside the Solar
System, Outside the Solar
System